

WHAT IS CLAIMED IS:

1. A method of pumping a wide bandwidth optical parametric oscillator to provide mid-IR radiation, comprising the step of pumping the optical parametric oscillator with a Thulium laser operating by itself as the pump source for the optical parametric oscillator.
2. The method of Claim 1, wherein the Thulium laser utilizes a  $\text{YAlO}_3$  host.
3. The method of Claim 1, wherein the optical parametric oscillator includes a zinc germanium phosphide non-linear crystal.
4. The method of Claim 1, wherein the Thulium laser is Q-switched.
5. A method of pumping an optical parametric oscillator without utilizing Holmium, comprising the step of pumping the optical parametric oscillator with a Thulium laser output.
6. The method of Claim 5, wherein the optical parametric oscillator includes a zinc germanium phosphide crystal.

7. A Q-switched laser comprising:
  - a laser cavity;
  - a Thulium crystal within said cavity; and,
  - a Q-switch within said cavity.
8. The laser of Claim 7, wherein said Q-switch includes an acousto-optical Q-switch.
9. Apparatus for generating infrared radiation, comprising the combination of:
  - a Thulium laser; and,
  - an optical parametric oscillator pumped by said Thulium laser.
10. The apparatus of Claim 9, wherein said Thulium laser is a Tm:YAlO<sub>3</sub> laser.
11. The apparatus of Claim 9, wherein said optical parametric oscillator includes a ZnGeP<sub>2</sub> non-linear crystal.
12. The apparatus of Claim 11, wherein said optical parametric oscillator is in the form of a ring.
13. The apparatus of Claim 12, wherein said optical parametric oscillator includes two ZnGeP<sub>2</sub> non-linear crystals.

14. The apparatus of Claim 11, wherein said optical parametric oscillator is in the form of a linear resonator.

15. The apparatus of Claim 9, wherein said optical parametric oscillator is doubly resonant.

16. The apparatus of Claim 9, wherein said optical parametric oscillator has a non-linear crystal selected from the group consisting of zinc germanium phosphide, silver gallium selenide, silver gallium indium selenide, gallium arsenide and lithium niobate crystals.

17. The apparatus of Claim 9, wherein said Thulium laser is selected from the group consisting of YAG, YSGG, YALO, LuAG, YLF,  $Y_2O_3$  and  $YVO_4$  Thulium lasers.

18. The apparatus of Claim 9, wherein the optical parametric oscillator has a non-linear crystal selected from the group consisting of  $ZnGeP_2$ ,  $AgGaSe_2$ , AGIS,  $AgGaS_2$ , OPGaAs and PPLN non-linear crystals.